## REMARKS

### I. Introduction

In response to the Office Action dated July 1, 2005, claims 1, 9, 12, 16, 19, 24, and 26-31 have been amended. Claims 1, 4-6, 8-19, 21, and 23-31 remain in the application. Re-examination and re-consideration of the application, as amended, is requested.

### II. Non-Art Rejections

In paragraph (1) of the Office Action, claim 19 was rejected under 35 U.S.C. §101, as being directed to nonstatutory subject matter. Applicants have amended claim 19 as suggested in the Office Action and submit that the rejection is now moot.

### III. Prior Art Rejections

In paragraphs (2)-(3) of the Office Action, claims 1, 4-6, 8, 12-14, 16-19, 21, 23, and 26-31 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lim, U.S. Patent No. 5,638,126 in view of Linzer, U.S. Patent No. 6,038,256 (Linzer). On page (8) of the Office Action, claims 9-11, 15, and 24-25 were rejected under 35 U.S.C. §103(a) as being unpatentable over Lim, Linzer and in view of Gonzales, U.S. Patent No. 5,231,484 (Gonzales).

Specifically, the independent claims were rejected as follows:

> Regarding claims 1 and 19, Lim discloses a program storage media storing computer executable instructions, the instructions to cause a computer to:
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> estimate forms of a plurality of functions, each function relating encoded size to encoded quality for each frame in a sequence of frames, each frame having data for an image (fig. 1, element 10 is the controller connected to the buffer 120 that receives various sizes or amounts of frame image data encoded by coder 110, where a sequence of frames is sent through the encoding system of fig. 1 in that since Lim's invention uses an MPEG encoder for encoding a plurality of images, I, P and B frames, each frame within that sequence of frames (GOP) have different sizes, and further, note quantization controller 10, there is a selector 160 that decides which quantization parameter to use on the evaluated frame(s) in order to properly allocate the number of bits to the evaluated frame(s) for efficient coding);
>
> perform a search of all frames in the sequence of frames for a best quality value for encoding the sequence of frames whose encoded sizes satisfy one or more constraints, the constraints being associated with one or more of a transmission line bandwidth, a receiver buffer size and a total size constraint, the estimating a best quality value being based in part on the functions (fig. 1, element 10 is the controller connected to the buffer 120 that receives various sizes or amounts of frame image data encoded by coder 110, where the process of generating the encoded data at an acceptable bit rate for transmission in that a recursive process is done to monitor the quality of the encoded bit frames by checking on the buffer fullness to determine the total size constraint, and note Qp adjuster 130 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp, thus, best quality value is ascertained; see col. 3, ln.47-53);

encode each frame of the entire sequence of frames with the best quality value (fig. 1, note Qp adjuster 130 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp, and coder 110, utilizes the information from quantization parameter deciding block 10 for coding with the best quality value);

determine whether each encoded frame satisfies the constraints (fig. 1, note a recursive process is done to monitor the quality of the encoded bit frames by checking on the buffer fullness to determine the total size constraint to determine whether the frame satisfies the constraints); and

if the encoded frames satisfy the constraints, order transmission of frames of the sequence (fig. 1, note data from buffer 120 is transmitted to transmission for transmission of frames of the sequence of images).

Lim does not specifically disclose the prior to encoding any of the frames that performs a search of all frames in the sequence of frames for a best quality value. However, Linzer teaches that prior to encoding any of the frames, there is an execution of searching of all the frames prior to encoding any of the frames (fig. 3, element 24 and col.5, In.63-67 and col.6, In.9-13 and In.25-26, note the statistics gatherer 24 obtains a search of all the frames from the video sources to obtain a best quality value prior to encoding any of the frames). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Lim and Linzer, together as a whole, for gathering all of the possible pre-encoding data so as to efficiently encoding high quality images in an accurate, precise manner (Linzer col.3, In.64 to col.4, In.13).

Regarding claim 16, Lim discloses a system for encoding image frames, the system comprising:

a controller connected to receive data on sizes on image frames that are part of a sequence of image frames (fig. 1, element 10), to be encoded by the encoder and to control quality of the encoded frames produced by the encoder based on:

an estimation of forms of a plurality of functions, each function relating encoding size to encoded quality for each frame in the sequence of frames (fig. 1, element 10 is the controller connected to the buffer 120 that receives various sizes or amounts of frame image data encoded by coder 110, where a sequence of frames is sent through the encoding system of fig. 1 in that since Lim's invention uses an MPEG encoder for encoding a plurality of images, I, P and B frames, each frame within that sequence of frames (GOP) have different sizes, and further, note quantization controller 10, there is a selector 160 that decides which quantization parameter to use on the evaluated frame(s) in order to properly allocate the number of bits to the evaluated frame(s) for efficient coding);

a search of all frames in the sequence of frames for a best quality value for encoding the sequence of frames whose encoded sizes satisfy one or more constraints, the constraints being associated with one of a bandwidth of a transmission line, space in a receiver buffer and a total compressor size (fig. 1, element 10 is the controller connected to the buffer 120 that receives various sizes or amounts of frame image data encoded by coder 110, where the process of generating the encoded data at an acceptable bit rate for transmission in that a recursive process is done to monitor the quality of the encoded bit frames by checking on the buffer fullness to determine the total size constraint, and note Qp adjuster 130 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp, thus, best quality value is ascertained; see col.3, In.47-53); and

a variable bit rate encoder controller by the controller configured to encode each frame of the entire sequence of frames with the best quality value, wherein the controller is further configured to determine whether each encoded frame satisfies the constraints, and if the encoded frames satisfy the constraints, transmitting the sequence of encoded frames (fig., element 110 is the variable bit rate encoder controlled by the controller 10 connected to the buffer 120 that receives various sizes or amounts of frame image data encoded by coder 110, where the process of generating the encoded data at an acceptable bit rate for transmission in that a recursive process is done to monitor the quality of the encoded bit frames by checking on the buffer fullness to determine the total size constraint, and note Qp adjuster 130 adjusts the quality of the encoded frames and element 160 selects the best quality value Qp, thus, best quality value is ascertained; see col.3, In.47-53).

> Lim does not specifically disclose the prior to encoding any of the frames that performs a search of all frames in the sequence of frames for a best quality value. However, Linzer teaches that prior to encoding any of the frames, there is an execution of searching of all the frames prior to encoding any of the frames (fig.2, element 24 and col.5, ln.63-67 and col.6, ln.9-13 and ln.25-26, note the statistics gatherer 24 obtains a search of all the frames from the video sources to obtain a best quality value prior to encoding any of the frames). Therefore, it would have been obvious to one of ordinary skill in the art to combine the teachings of Lim and Linzer, together as a whole, for gathering all of the possible pre-encoding data so as to efficiently encoding high quality images in an accurate, precise manner (Linzer col.3, ln.64 to col.4, ln.13).

Applicants traverse the above rejections for one or more of the following reasons:

(1) Neither Lim, Linzer, nor Gonzales teach, disclose or suggest a separate function, for each frame in a sequence of frames, that relates encoded size to encoded quality for each frame;

(2) Neither Lim, Linzer, nor Gonzales teach, disclose or suggest a search of all of the separate functions to determine a best quality value to encode the entire sequence; and

(3) Neither Lim, Linzer, nor Gonzales teach, disclose or suggest encoding each frame using the same determined best quality for all of the frames.

Independent claims 1, 16, and 19 are generally directed to encoding data. More specifically, a separate function for each frame in a sequence of frames is determined. Each function relates encoding size to encoded quality for each frame in the sequence of frames. Before encoding any frames in a sequence, a search of all of the separate functions is conducted to determine a best quality value for encoding the entire sequence. The encoded sequence satisfies various constraints. Once the best quality value is determined (based on the search of the functions), each frame of the entire sequence is encoded with the same best quality value. Once encoded, a determination is made regarding whether each encoded frame in the sequence satisfies the constraints. If the encoded frames satisfy the constraints, the system merely transmits the already encoded sequence of frames. However, as set forth in the dependent claims, if one or more encoded frames do not satisfy the constraints the process repeats by determining a new separate function that is based on the prior separate function determining and search. Thereafter, the search, encoding, and determining (whether the encoded frames satisfy the constraints) steps are repeated based on the new function.

The cited references do not teach nor suggest these various elements of Applicants' independent claims.

In rejecting the function related aspects of the claims, the Office Action relied on Lim Fig. 1. Applicants note that in Lim, a video signal encoding apparatus is used to convert blocks into

coefficients that are then processed by a quantization circuit. The quantization circuit merely receives in the form of a quantization parameter (Qp) that is used with a matrix of base quantization step sizes to determine what data should be output (see col. 3, lines 15-36). However, the Qp used by the quantization circuit is merely based on the fullness of the buffer (see col. 3, lines 47-53). Lim also describes a frame that is made up of multiple slices. The end result that Lim produces is that a Qp for a second slice (of a preceding frame) is used as the Qp for the first slice of a current frame (see col. 4, lines 8-20). Again, the Qp is based on a buffer fullness and is processed with a matrix of base quantization steps to determine a particular size of quantized data to generate (see col. 3, lines 20-35).

However, contrary to the present claims, Lim does not even remotely describe a function for each frame in a sequence. Further, Lim does not teach, describe, suggest, allude to, or hint at a function that relates encoded size to encoded quality for each frame in a sequence. In addition, Lim does not perform a search of all such functions to determine a single best quality value that is used to encode all of the frames in a sequence. In this regard, the Office Action attempts to assert that the use of an MPEG encoder and a selector that decides which Qp to use, is equivalent to the functions determined in the present invention. Applicants respectfully disagree. The mere selection of a Qp does not and cannot teach, disclose, or suggest, a function that is determined for each frame in a sequence. Nor does such a selection take into account that all of such functions are searched before encoding any of the frames. Accordingly, Lim fails to teach various aspects for which it has been asserted.

In addition, Applicants note that Linzer also fails to cure the deficiencies of Lim. The Office Action relies on Linzer for the prior search aspects of the claims. Applicants respectfully traverse such reliance on Linzer in view of the claim amendments. Namely, as amended, the search is conducted across the separate functions and not of the frames. Further, the search of the functions is used to determine a best quality value for encoding the entire sequence of frames in view of various constraints. Linzer teaches the gathering of statistics regarding video signals and that are indicative of the complexity of a signal that is generated before a bit allocation decision is made (see col. 5, lines 63-67; col. 6, lines 9-11). However, the mere existence of statistics does not teach the use or determination of a function that is based on such statistics. Again, the claims are directed towards determining a separate function for each frame in a sequence and not merely a collection of

statistics regarding each frame. As claimed, the function relates encoded size to encoded quality. Further, the functions are searched to determine a best quality value. Linzer lacks any capability, suggestion, or motivation, to create a function or to search various functions to determine the best quality value for encoding all of the frames in a sequence.

In view of the above, Applicants submit that both Lim and Linzer clearly lack any description of a function, the determination of a function, or the searching of numerous functions as claimed. The other cited references also fail to cure the defects of Lim and Linzer.

Moreover, the various elements of Applicants' claimed invention together provide operational advantages over Lim, Linzer, and Gonzales. In addition, Applicants' invention solves problems not recognized by Lim, Linzer, and Gonzales.

Thus, Applicants submit that independent claims 1, 16, and 19 are allowable over Lim, Linzer, and Gonzales. Further, dependent claims 4-6, 8-15, 17-18, 21, and 23-31 are submitted to be allowable over Lim, Linzer, and Gonzales in the same manner, because they are dependent on independent claims 1, 16, and 19, respectively, and thus contain all the limitations of the independent claims. In addition, dependent claims 4-6, 8-15, 17-18, 21, and 23-31 recite additional novel elements not shown by Lim, Linzer, and Gonzales.

IV. Conclusion

In view of the above, it is submitted that this application is now in good order for allowance and such allowance is respectfully solicited. Should the Examiner believe minor matters still remain that can be resolved in a telephone interview, the Examiner is urged to call Applicants' undersigned attorney.

Respectfully submitted,

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